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Environmental Impact Statement
Noise Emission Regulation for Buses

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This document presents an assessment of the expected benefits and impacts of the Final Noise Emission Regulation for Buses. The information presented includes a description of the bus noise problem, the statutory basis for the action, a summary of the regulation, State and local programs complementary to Federal noise emission standards for buses, the alternatives considered, the expected benefits of the regulation, the potential economic effects of the regulation, public comments on the draft environmental impact statement, and conclusions.

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ENVIRONMENTAL PROTECTION AGENCY

ENVIRONMENTAL IMPACT STATEMENT

FOR THE

FINAL

NOISE EMISSION REGULATION FOR BUSES

Prepared By

Office of Noise Abatement and Control
U.S. Environmental Protection Agency
Washington, D.C. 20460

Approved By

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July 1980

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SUMMARY

FINAL

Agency: U.S. Environmental Protection Agency
Office of Noise Abatement and Control (EPA/ONAC)

Action: Noise Emission Regulation for Buses

Description of Action:

1. The regulation is intended to complement existing noise emission standards for surface transportation equipment by alleviating the adverse health and welfare impacts on people, resulting from that portion of traffic noise that is attributable to buses.

2. The regulation is issued under the authority of Section 6 of the Noise Control Act of 1972 (42 U.S.C. 4905). Buses were identified by EPA as a major source of noise on May 28, 1975 (40 Federal Register 23105), under the authority of Section 5(b)(1) of the Noise Control Act. A Notice of Proposed Rulemaking (NPRM) was published on September 12, 1977 (42 Federal Register 45776).

3. Buses manufactured after September 1, 1981 and having a Gross Vehicle Weight Rating (GVWR) greater than 10,000 pounds, must not emit noise (1) in excess of 83 decibels (dB) when measured at a distance of 15 meters (approximately 50 feet) from the center line of travel as the bus is accelerated under full throttle. The not-to-exceed noise emission level is reduced to 80 dB for buses manufactured after September 1, 1985 and further reduced to 77 dB for buses manufactured after September 1, 1987.

4. Concurrent with the above regulatory schedule, the interior noise level of the subject buses must not exceed 86 dB, 83 dB, and 80 dB respectively. The measurement will be taken at an interior location where the bus occupants will be exposed to the highest noise level when the bus is operated in the same manner as for the exterior noise tests.

5. The 1987 exterior and interior noise emission standards do not apply to school buses, buses incorporating cowl chassis, and cowl chassis.

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1. All noise levels are expressed in terms of A-weighted decibels.

6. The regulation requires that the manufacturer design and build each bus so that its noise level will not degrade (increase) above the applicable level for a minimum period (the Acoustical Assurance Period, or AAP) of 2 years or 200,000 miles after delivery to the ultimate purchaser.

7. The regulation specifies a Low Noise Emission Product (LNEP) level of 72 decibels (exterior) and 75 decibels (interior) effective September 1, 1980.

8. The regulation incorporates a compliance program which includes manufacturer self-certification through production verification testing, selective enforcement auditing by the EPA, compliance labeling requirements for manufacturers, operator maintenance provisions for noise control components, and anti-tampering provisions for operators.

Benefits:

1. Compliance with the most stringent standards is expected to reduce the exterior noise level of all buses by an average of 5 decibels and their interior levels by an average of 7 decibels.

2. Human activity interferences (sleep disruption, sleep awakening, indoor speech interference, outdoor speech interference, and pedestrian speech interference) due to bus noise are expected to be reduced by 51-67% for intercity buses, 36-62% for transit buses, and 26-46% for school buses.

3. The extent and severity of potential passenger speech interference impacts are expected to be reduced by 28% for intercity buses, 85% for transit buses, and 78% for school buses.

4. A 1 to 100% reduction in potential risk of hearing loss for bus operators and passengers is expected, depending upon the range of daily non-bus noise exposure experienced by passengers and drivers, i.e., the greater the non-bus related noise exposure, the greater the benefits from quiet buses.

Economic Effects:

1. The nominal list price increases for buses could range from 0.08 to 3.4 percent (depending on bus type and size). The weighted average list price increase is expected to be about 0.6 percent for all buses.

2. The potential increase in annualized cost to bus operators is estimated to be $51 million through the year 2010. These costs include anticipated increases in purchase price, operation and maintenance costs, noise testing costs, and other compliance costs.

3. The costs passed through to passengers of transit buses may increase fares by no more than 1.1 percent per mile; a typical fare of 75 cents may increase by less than one cent by 1997.

4. The costs passed through to passengers of intercity buses may increase fares by 0.7 percent per mile; a typical fare of $74.85 may increase by 52 cents by 1997.

5. The average school district budget may increase by $1,285 or 3/100 of one percent of the total budget per school district.

Alternatives:

1. Section 6 of the Noise Control Act of 1972 requires the Administrator of EPA to propose regulations for each product identified under Section 5(b)(1) as a major source of noise and for which noise emission standards are feasible. Buses were identified as a major source of noise on May 28, 1975. The results of Agency studies of best available noise control technology and the attendant costs of compliance show the regulation to be feasible. No evidence has been received to indicate that buses are no longer a major source of noise. Based on the requirements of the Noise Control Act, the Administrator must issue a new-product noise emission regulation for buses.

Comments to the Draft EIS:

1. There were no comments specifically addressing the draft EIS.

2. All comments to the proposed regulation as a whole are presented in the "Docket Analysis for the Final Noise Emission Regulation for Buses", EPA Document No. 550/9-80-213.

Dates of Availability:

1. The Draft EIS was made available to the public on September 12, 1977.

2. The Final EIS was made available on the date the Final Noise Emission Regulation for Buses appeared in the Federal Register.

Address:

1. Copies of the EIS can be obtained or reviewed by contacting:

Mr. Charles Mooney
EPA Public Information Center (PM-215)
U.S. Environmental Protection Agency
Washington, D.C. 20460

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ENVIRONMENTAL IMPACT STATEMENT FOR THE FINAL NOISE EMISSION REGULATION FOR BUSES

INTRODUCTION

The U.S. Environmental Protection Agency (EPA) has issued a noise emission regulation for newly manufactured buses. This regulation is intended to alleviate the adverse health and welfare impacts on people, resulting from that portion of traffic noise that is attributable to the operations of intracity transit, intercity, and school buses.

This Environmental Impact Statement (EIS) presents, in summary form, the benefits to be gained from the bus noise standards and the potential economic implications of this action. The information contained in this document addresses the principal issues involved with this rulemaking and EPA's continuing activities in carrying out its Congressional mandate to promote a quieter environment for all Americans.

REGULATORY ANALYSIS

In arriving at the not-to-exceed noise standards for new buses, the Agency considered the best available noise abatement technology, potential health and welfare benefits, and the attendant costs and economic effects of compliance. The decision of regulatory levels and effective dates was based on technical data and other information gathered by EPA from meetings with manufacturers and operators, and from published data and public comments. This information has been compiled and analyzed by EPA, and is presented in the "Regulatory Analysis for the Final Noise Emission Regulation for Buses", EPA Document No. 550/9-80-212, copies of which can be obtained from:

Mr. Charles Mooney
EPA Public Information Center (PM-215)
U.S. Environmental Protection Agency
Washington, D.C. 20460

Additional copies of the EIS may also be obtained from the above listed office.

The preamble and text of the regulation can also be obtained from the EPA Public Information Center (PM-215).

For the sake of brevity and simplicity the information contained in the EIS is presented in summary form only. Persons wishing a more detailed explanation and discussion of the facts and issues pertinent to the bus noise rulemaking are encouraged to refer to the Regulatory Analysis.

ADDITIONAL INFORMATION

Specific questions related to the regulation can be directed to:

Ms. Francine Ely
Project Officer - Buses
Office of Noise Abatement and Control (ANR-490)
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Washington, D.C. 20460
(703) 557-7666.

DESCRIPTION OF THE BUS NOISE PROBLEM

Traffic noise constitutes the single most pervasive source of noise pollution in the U.S. today. EPA estimates that approximately 93 million people are currently exposed to traffic noise levels equal to or greater than a day-night noise level (L_{dn})[1] of 55 dB[2]. Buses are an integral component of the total traffic flow and constitute a significant noise problem, particularly in the urban environment. EPA has determined the effects of bus noise on the public's health and welfare by examining a number of anticipated noise effects. These include the general adverse response (measured in terms of annoyance or objectionableness with the noise) of persons in communities exposed to bus noise as a component of the traffic stream; risk of noise-induced hearing damage to bus drivers and passengers; and interferences or disturbances with everyday activities (including conversation and sleeping).

With over 400,000 buses in operation on our nation's streets, EPA estimates that each of the 93 million persons exposed to traffic noise levels in excess of an annual L_{dn} of 55 dB is impacted to varying degrees by noise from buses. More importantly, EPA estimates that millions of people experience noise from buses that may interfere with their activities on both a daily and nightly basis. Further, EPA believes that in excess of 30 million riders and 400,000 bus drivers are exposed daily to levels of noise which interfere with their speech communication and offer a potential risk of hearing loss.

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1. The Environmental Protection Agency has identified a yearly Ldn of 55 dB as the environmental noise level requisite to protect the public health and welfare with an adequate margin of safety (Ldn being the day-night sound level which is the A-weighted equivalent sound level for a 24-hour period with an additional 10 dB weighting imposed on the equivalent sound levels occurring during nighttime hours (10 p.m. to 7 a.m.)).

2. All noise levels are expressed in terms of A-weighted decibels.

For the purpose of the regulation, a bus is defined as any engine-powered vehicle with an enclosed passenger compartment designed for the transportation of passengers on a street or a highway and having a Gross Vehicle Weight Rating (GVWR) in excess of 10,000 lbs.

There are basically three major classes of buses as shown in Figure 1.

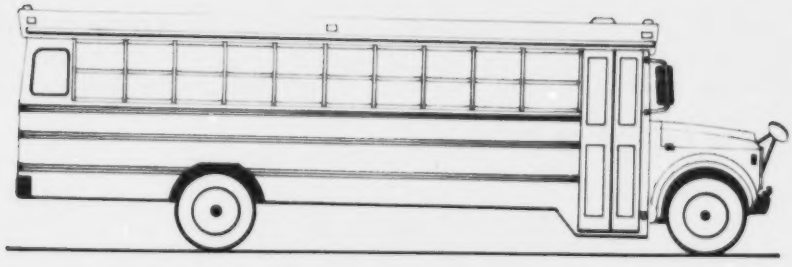
(1) Intracity transit: This type of bus is primarily used for commuter transportation, but also finds use for charter service, school transport, and other specialized operations. These buses have a current population of approximately 52,000 vehicles and an average operating life of 10-15 years. There are approximately 5,000 new vehicles of this type per year, their exterior noise levels range from 78 to 86 decibels (dB), and their interior noise levels range from 80 to 90 dB.

A new type of public transit bus recently introduced is known as the Advanced Design Bus (ADB). EPA anticipates that most future transit buses will be of the ADB type because of very favorable subsidies from the Federal government's Urban Mass Transportation Administration (UMTA). These ADB's are presently required to meet an UMTA specification of a not-to-exceed 83 dB exterior noise level in order to qualify for Federally subsidized purchase.

(2) Intercity: This type of bus is primarily used for long-distance passenger transport, but also finds widespread use for airport limousine service, sightseeing and charter uses. There are two

(1) Transit

(2) Intercity



(3) School Bus
(incorporating a cowl chassis)

FIGURE 1
CLASSES OF BUSES

principal manufacturers of intercity buses: Eagle (Continental Trailways) and Motor Coach Industries (Greyhound). These buses have a current population of about 20,000 vehicles and an average operating life of 12-15 years. There are approximately 1,000 new vehicles of this type per year, their exterior noise levels range from 82 to 87 dB, and their interior noise levels range from 77 to 84 dB.

(3) School: While this type of bus is primarily intended for the transport of children to and from schools, they frequently are used by churches, social clubs, penal institutions, and some transit authorities. The current population is approximately 360,000 vehicles with about 90 percent utilizing "cowl chassis," which are basically medium truck chassis without cabs. The average operating life for these buses is 8-12 years. There are approximately 30,000 new vehicles of this type per year, their exterior noise levels range from 75 to 89 dB, and their interior noise range from 81 to 89 dB.

STATUTORY BASIS FOR ACTION

Congress passed the Noise Control Act (NCA) of 1972, 42 U.S.C. 490 et seq., in part as a result of their findings that inadequately controlled noise presents a growing danger to the health and welfare of the nation's population, particularly in urban areas. Through the NCA, the Congress established a national policy to "promote an environment for all Americans free from noise that jeopardizes their health or welfare." In

pursuit of that policy, Congress stated in Section 2 of the Act that "while primary responsibility for control of noise rests with state and local governments, Federal action is essential to deal with major noise sources in commerce, [the] control of which requires national uniformity of treatment." As part of this essential Federal action, Section 5(b)(1) of the Act requires that the Administrator of the U.S. Environmental Protection Agency, after consultation with appropriate Federal agencies, publish a report, or series of reports, "identifying products (or classes of products) which in his judgement are major sources of noise." Section 6 of the Act requires the Administrator to publish regulations for each product identified as a major source of noise and for which, in his judgement, noise standards are feasible. Such products fall into various categories, one of which is surface transportation equipment.

Inasmuch as a number of different types of transportation equipment operate at the same time, the quieting of one product type is often not in itself sufficient to adequately reduce transportation noise to a level necessary to protect public health or welfare. Accordingly, the EPA's noise regulatory program has developed a coordinated approach to controlling overall transportation noise in which various types of transportation equipment, alone or in combination, are evaluated to assess their contribution to transportation noise and its impact on the nation's population.

Under the mandate of the Noise Control Act, EPA's approach to the control of transportation noise is to issue noise emission standards. Federal noise emission standards were promulgated on October 29, 1974, for interstate motor carriers (39 FR 38209); on March 31, 1976, for medium

and heavy trucks (41 FR 15538); and on October 1, 1979, for truck-mounted solid waste compactors (44 FR 56523). Regulations are currently under development for the control of noise emissions from motorcycles and their after-market exhaust systems.

On May 28, 1975 (40 FR 23105) buses were identified as a major source of noise. The identification of buses was based, in part, on their close mechanical and acoustical relationship to trucks and, more particularly, on their contribution to the adverse health and welfare effects of traffic noise on the U.S. population. Further, buses are unique in that they also pose a particularly adverse noise impact on their riders and drivers. A Notice of Proposed Rulemaking (NPRM) to regulate noise emissions from buses was published on September 12, 1977 (42 FR 45776). Public comment was solicited for 90 days and two public hearings were held (Washington, D.C. on October 25, 1977, and San Francisco, California on November 1, 1977). A thorough review and consideration of the public comments was carried out prior to the issuance of the final rule.

The final regulation is intended to alleviate the adverse health and welfare impacts on people, from that portion of traffic noise that is due to buses. The regulation is also intended to establish a uniform national noise standard for buses distributed in commerce, thereby eliminating conflicting State and local noise source emission regulations that may impose an undue burden on the bus manufacturer and operator industries.

SUMMARY OF THE REGULATION

The regulation establishes both exterior and interior standards for noise emissions resulting from the operation of newly manufactured buses.

The regulation does not require buses manufactured before the effective dates to comply with the emission standards.

The testing procedure for measuring the exterior bus noise level is a modification of the Society of Automotive Engineers (SAE) standard J366b. The test is designed to measure the maximum noise output of a bus at a distance of 15 meters (approximately 50 feet) from the center line of travel as the bus is accelerated under full throttle.

The bus interior noise test procedure requires that the measurement microphone be placed inside the bus near the seat closest to the main body of the engine and tilted toward the engine. The noise level is recorded while the bus is operating in a manner identical to that for the exterior noise measurements.

After the effective dates specified in Table 1 below, the exterior and interior noise levels of newly manufactured buses and cowl chassis which will be used as bus chassis, must not exceed the designated A-weighted noise emissions when measured in accordance with the applicable measurement procedures.

TABLE 1
NOT-TO-EXCEED NOISE LEVELS

Effective Date	Exterior Level	Interior Level
September 1, 1981	83 decibels	86 decibels
September 1, 1985	80 decibels	83 decibels
September 1, 1987	77 decibels	80 decibels

The 1987 exterior and interior standards do not apply to buses that are required to meet the Federal Motor Vehicle Safety Standards FHVSS 220, 221, 222 and 301, and Highway Safety Program Standard 17 as specified for

"school buses"; buses that incorporate cowl chassis; and cowl chassis. At the present time, the 1985 limits are the most stringent that will be applicable to these buses. The Agency received substantial evidence that the "cowl chassis" used in over 90 percent of newly manufactured school type buses today are basically medium truck chassis. This regulation complements and is consistent with the April 13, 1976, Federal noise regulation for medium and heavy trucks. Since most school buses incorporate medium truck cowl chassis, the 1987 school bus standards have been deferred so that they can be made consistent with the anticipated new standard for medium and heavy trucks (more stringent than the presently established 1982 standard) which EPA intends to propose in the near future. The Agency will, at a future date, make available for public review and comment, its proposed 1987 standards for school buses.

EPA believes that the estimated health and welfare benefits from this regulation can be attained only if the regulated buses conform to the prescribed noise levels for a reasonable period of time. Therefore, in order to ensure lasting benefits from this regulation, the Agency requires that manufacturers design and build each bus so that, when properly used and maintained, its noise level will not degrade (increase) above the applicable levels in Table 1, for a specified period of time or use, from the date of the bus' sale to the ultimate purchaser. This period, which is called the Acoustical Assurance Period (AAP), has been designated for buses to be a minimum of two (2) years or 200,000 miles, whichever occurs first.

Under the authority of Section 15 of the Noise Control Act, the Federal government may pay a premium of up to twenty-five percent of the normal purchase price for a product that is subject to a Federal noise emission

standard and whose noise level meets or is less than the product's specified Low Noise Emission Product (LNEP) level. To qualify as a Low Noise Emission Product, the maximum noise level of a bus must not exceed 72 dB (exterior) and 75 dB (interior), effective September 1, 1980.

The regulation incorporates an enforcement program which includes requirements for manufacturer self-certification through production verification testing, selective enforcement auditing by the EPA, compliance labeling, anti-tampering warnings and maintenance guidance to purchasers. Production verification (PV) means that prior to the distribution into commerce of any bus, a manufacturer must submit information to EPA which demonstrates that his product conforms to the standards. Selective enforcement auditing (SEA) means that in response to an administrative request from EPA, a statistical sample of buses must be tested to determine if the units, as they are produced, meet the standard.

STATE AND LOCAL PROGRAMS COMPLEMENTARY TO FEDERAL NOISE EMISSION STANDARDS FOR BUSES

Under the authority of the Noise Control Act of 1972 this regulation establishes a uniform national standard for newly manufactured buses that preempts, after its effective date, all State and local new source emission regulations that are not identical with the Federal regulation. The authority of State and local governments to regulate interstate buses, which would include most intercity buses, is preempted by the Federal interstate motor carrier regulation. States and localities can adopt and enforce standards which are identical to the Federal regulation and EPA encourages this.

States and communities are not preempted from establishing operational controls on urban transit buses and school buses, although they cannot establish in-use emission limits on newly manufactured vehicles which are different from those limits set by the EPA. They can, though, require more stringent noise emission levels through their purchase specifications. State and local community enforcement actions are essential supplements to any Federal regulation to ensure that vehicles, once in service, maintain noise levels at or below that required by the regulation, particularly during the Acoustical Assurance Period, and to discourage tampering with noise control equipment. EPA intends to promote the establishment of bus noise programs through its on-going assistance programs to States and localities. In addition, the Agency will make available a supplement to its model ordinance which will specifically address buses and which will outline acceptable in-use noise test procedures.

Of particular importance to the control of bus noise at the local level are efforts by communities to ensure that buses are properly maintained and operated by city-owned or supported bus facilities. Based upon the Agency's experience with one city fleet of buses, it was evident that exterior noise levels increased by as much as 6 dB[1] when buses were improperly maintained. The Federal regulation itself contains two features which will necessitate proper maintenance:

(1) First, a warranty provision is required of each manufacturer which covers any defects in the design or assembly, or in any part, component, or system of the vehicle which, at the time

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1. Letter report, from Michael Kaye, Portland, OR, to Robert English, EPA/ONAC, Washington, D.C. May 15, 1980.

of sale to the first purchaser, for purposes other than resale, causes the exterior noise levels to exceed the Federal standard at any time during the lifetime of the vehicle.

(2) Secondly, each manufacturer is required to provide bus purchasers written instructions for proper maintenance, use and repair of the vehicle which will provide reasonable assurance that the vehicle stays in compliance with the Federal limit during the Acoustical Assurance Period. In addition, manufacturers are required to provide information on what acts constitute tampering.

Clearly, the warranty provisions should provide a strong incentive to owners of bus fleets, including cities, to follow proper maintenance procedures and to exercise particular caution during maintenance to ensure compliance with the Federal law against tampering.

In addition to ensuring that new buses are maintained at their regulatory noise levels, owners of bus fleets - particularly cities - may want to consider retrofitting buses already in the fleet. The City of Portland, Oregon recently undertook a transit bus retrofit program. The reduction in exterior noise levels was about 3.5 dB[1] using the EPA test procedure which requires thermostatically controlled fans to be operating.

As part of the President's Urban Noise Program, the Department of Transportation has made the retrofit of buses to abate noise an allowable expense under Urban Mass Transportation Administration grants.

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1. Noise Reduction Retrofit for a Contemporary Flxible Transit Bus, UMTA OR-06-0005-80-1, Michael C. Kaye, December 1979.

The noise controls which are reserved to State and local authority by Subsection 6(e)(2) of the Noise Control Act include, but are not limited to, the following:

(1) Controls on the manner of operation of products,

(2) Controls on the time during which products may be operated,

(3) Controls on the places at which products may be operated,

(4) Controls on the number of products which may be operated together,

(5) Controls on noise emissions from the property on which products are used,

(6) Controls on the licensing of products,

(7) Controls on environmental noise levels.

By use of the noise controls reserved to them, State and local governments will be able to supplement Federal noise emission standards and to effect near-term relief from bus noise.

ALTERNATIVES CONSIDERED

Section 6 of the Noise Control Act of 1972 requires the Administrator to set regulations for each product which he has identified under Section 5(b)(1) of the Act as a major source of noise and for which noise emission standards are feasible. Buses were identified as a major source of noise on May 28, 1975 (40 FR 23069).

Following the identification, comprehensive studies were performed to evaluate bus noise emission levels necessary to protect the public health and welfare, taking into account the magnitude and condition of use, the degree of noise reduction achievable through application of the best available technology, and the attendant costs of compliance. The Agency carried out

detailed investigations of bus design, manufacturing and assembly processes, noise measurement methodologies, available noise control technology, costs attendant to noise control methods, costs to test buses for compliance, costs of recordkeeping, possible economic impacts, and the potential environmental and health and welfare benefits associated with the application of various noise control measures.

The results of the Agency's studies show that the regulation of bus noise is feasible through the application of best available noise control technology taking cost of compliance into account. In addition, no evidence has been received by the Agency to indicate that buses are no longer a major noise source. Therefore, based on the requirements of the Noise Control Act, the Administrator must issue a new-product noise emission regulation for buses.

Within the context of prescribing this regulation under the Noise Control Act, the only alternative open to the Administrator was the selection of levels of stringency and effective dates. In the development of the proposed regulation, a large range of regulatory options (i.e., not-to-exceed noise levels and effective dates for various classes of buses) were considered. Some 198 options were screened in terms of environmental objectives, available technology, economic considerations and existing complementary regulations. The final regulatory levels and effective dates were chosen on the basis of maximum benefits and minimal adverse economic effects. The Agency concluded that reducing the noise limits below values established by this regulation would provide only marginal gains in benefits.

A detailed discussion of the alternatives and options considered is provided in the Regulatory Analysis.

BENEFITS OF THE REGULATION

Health and Welfare

Compliance with the standards is expected to reduce the exterior noise level of all buses by an average of 5 decibels (dB) and their interior levels by an average of 7 dB.

Compliance with the bus noise emission standards is expected to result in a 51-67 percent reduction in the extent and severity of those potential human activity interference impacts[1] due to intercity type buses, a 36-62 percent reduction in these impacts due to transit type buses, and a 26-46 percent reduction in these impacts due to school buses. The regulation will also result in a 1.0 percent reduction in the extent and severity of overall traffic noise impact.

The health and welfare impacts from interior noise were assessed in terms of the reduction of potential communication interferences inside buses and the reduced potential for hearing loss risk by bus passengers and operators. Hearing damage is generally brought about by noise exposure on a continuing, 24 hour, day-to-day basis. To ascertain the potential hearing loss effects due to interior noise on bus passengers and operators, the Agency assumed a range of three non-bus daily noise exposures (60 dB, 70 dB, and 80 dB) for all bus occupants. The Agency's estimate of interior bus noise hearing loss risk assumes an exposure to interior bus noise combined with other daily noise exposures.

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1. Human activity interference impacts are measures used as an indicator of people's adverse reaction to noise intrusions.

Compliance with the standards for interior noise levels is expected to result in a 28 percent, 85 percent, and 78 percent reduction in potential passenger speech interference impact for intercity, transit and school buses, respectively. Compliance with the interior standards for all bus types is expected to result in a one (1) to 100 percent reduction in the potential risk of hearing loss for bus drivers and passengers, depending upon the range of other daily non-bus noise exposure these people may receive. For example, if a passenger's or driver's daily non-bus noise exposure level is 60 dB, the percent reduction, due to the regulation, of potential hearing loss risk would be around 100 percent. However, with a daily non-bus noise exposure level of 80 dB, the percent reduction would be only about one (1) percent.

This regulation should provide increasing benefits on a continuing basis commencing with the first effective date and continuing through the year 2010. All of the above stated estimates are the anticipated total percent reduction in noise impacts realized by the year 2010.

Energy

Compliance with the standards may result in increased vehicle weight for some types of regulated buses. The Agency has given careful consideration to the possible increase in vehicle weight due to noise features and to the potential attendant changes in fuel consumption. EPA's investigations indicate that the expected noise control measures applied to school, transit and intercity buses should result, for the most part, in improved performance and better fuel economy. This should offset either partially or totally any potential increases in fuel consumption due to added weight.

The net increased fuel usage is expected to be small in most cases. However, some types of buses may experience decreases in fuel consumption of as much as 6.0 percent. Turbocharging and the installation of thermostatically controlled, variable speed fan drives are expected to be utilized to minimize noise emissions. While it is believed that these technologies would be applied regardless of the existence of noise control regulations in order to achieve improved fuel economy, the regulations should expedite the application of these technologies.

Land Use

It is anticipated that any impact of the regulation on land use will be beneficial. Many cities are considering following the example of Portland, Oregon, by restricting downtown areas to bus use only. The bus noise regulation should make areas adjacent to bus routes (including transit malls) less noisy, thereby making these areas more acceptable for commercial and residential development. Property values will generally benefit from reduced noise levels. The Agency has not attempted to quantify these potential benefits.

Air Quality

The effect of the regulation on air quality is expected to be insignificant.

Water Quality

The regulation is expected to have no adverse impacts on water quality or supply.

Solid Waste Disposal Requirements

No adverse effects on solid waste disposal requirements are expected due to the promulgation of the regulation.

Wildlife

The regulation is expected to have no adverse effects on wildlife. In fact, with regard to operations of buses in rural areas (predominantly intercity and school buses), potential benefits are expected in the form of reduced noise exposure to the wildlife of those areas. The Agency has not quantified these potential benefits.

ECONOMIC EFFECTS OF THE REGULATION

The establishment of noise standards for newly-manufactured buses gives rise to expenditures which would otherwise not be directly incurred by the private and public sectors. However, noise pollution is estimated to cost the American taxpayer many millions of dollars in hidden costs associated with decreased productivity, higher medical costs, and property value depreciation. One of the potential effects of an emission standard-setting, noise regulation is that, by reducing noise pollution, these estimated hidden costs may also be reduced. However, visible costs are imposed on those responsible for the pollution.

Recognizing that certain expenditures are necessary to protect the public health and welfare from inadequately controlled noise, the Agency performed analyses to estimate the magnitude and potential impact of these expenditures. Examined in the analyses were the structure of the industry, the estimated cost of abatement by bus type, the price elasticity of demand, the capital and annual costs of enforcement, the impact of enforcement on annual operating and maintenance costs, and the indirect impacts of the regulation.

Estimates of the costs to quiet both the interiors and exteriors of buses can be expressed in terms of anticipated increased list price. EPA estimates that nominal list price increases could range from 0.08 to 3.4 percent (depending on bus type and size), resulting in a weighted average list price increase of possibly 0.6 percent for all buses.

The costs of the regulation are expected to be passed along to the public gradually over time, as old, worn-out buses are replaced with new, quieter vehicles. Considering that the average life of new buses is about eleven years, it may be fourteen to nineteen years before fleets are composed entirely of buses meeting EPA's most stringent noise limit and the full costs of quieting are passed on to the public in the form of increased fares and school budgets.

The increased annualized cost to operators through the year 2010, due to implementation of both the interior and exterior standards, is estimated to be $51 million. This annualized cost includes anticipated increases in (1) the purchase price of buses, (2) operation and maintenance costs, (3) noise testing costs and (4) other compliance costs.

Impact on Transit Properties

A portion of any cost increase resulting for "transit type" buses will likely be funded through Federal programs under the Federal government's Urban Mass Transportation Administration (UMTA). Presently, UMTA policy provides up to 80 percent funding on the initial purchase of transit buses and up to 50 percent funding of the local company's operating costs. It is estimated that the initial purchase price will increase by 0.6 percent to 3.1 percent due to this regulation.

In assessing the maximum economic impact that the regulation may have on transit operations, EPA assumed 50 percent of the costs would be passed through and financed by passenger fare increases. Assuming a future fleet of buses all meeting the most stringent applicable noise standards, EPA estimates that the riders of transit buses might see a fare increase of up to 1.1 percent. Thus, a ride which costs 50 cents today may cost about one-half cent more in the year 1997.

Impact on Intercity Operations

It is estimated that the regulation may increase the initial purchase price of intercity buses by 0.7 to 3.4 percent. It is believed that any increases will be passed on fully to the consumer. Assuming a future fleet of buses all meeting the most stringent applicable noise standards, the average fare increase per mile should be no more than 0.7 percent. For example, if the fare from Washington, D.C. to Chicago were $74.85, as it is now, it could increase about 52 cents by the year 1997.

Impact on School Districts

School districts are expected to experience very modest cost increases as a result of this regulation. For those districts which purchase buses which incorporate a cowl chassis (approximately 90 percent of the present day school bus population consists of this type bus), the Agency estimates an increase in unit bus costs of 0.02 percent to meet the most stringent level. These increased costs are primarily related to anticipated increases in maintenance and operation and the very small increase in purchase price due to the Federal requirement for manufacturers to perform noise tests and maintain records.

Since the cowl chassis is basically a medium truck chassis without a cab, the Agency believes that the noise control features requisite to meet the bus standards are presently being applied on the production line to meet the current Federal noise standard for medium and heavy trucks. The Agency has strong reason to believe, based on noise tests and observation of manufacturing practices, that this technology is presently being applied to cowl chassis and that attendant costs are already being passed through to the user even in the absence of a bus regulation. Consequently, the Agency does not believe that added costs for noise control of cowl chassis will be imposed on these school districts.

We estimate that when school buses (cowl chassis and non-cowl chasis) comply with the 80 dB exterior level in 1985, their annual operating and maintenance costs may increase by about five percent. Based on a fleet of 25 school buses (considered to be average on a national basis), a typical school district's annual budget may increase $1285 (about 3/100 of one percent of the total budget per school district).

Impact on Manufacturers and Employment

The economic impact of this regulation on the national bus market is expected to be minimal. When the installation of the necessary noise reducing features becomes part of the assembly line process, the time to manufacture a finished bus will be essentially the same as it is presently. The production verification (PV) testing of bus noise emissions is also expected to be performed on a basis similar to that presently followed for medium and heavy trucks. This test procedure should not cause any significant delays in getting buses to the ultimate purchasers.

Regulating the noise emissions of buses is expected to have negligible effects on employment. In fact, there may be modest increases in the personnel needed to design, build, and install noise control components and conduct the necessary noise testing.

Impact on Suppliers

Some component suppliers may increase their sales depending on their ability to reduce the noise emissions of their products and thereby contribute to the reduction in overall vehicle noise. Furthermore, tnose suppliers specializing in the manufacture of sound dampening and sound absorbent materials and other products required for noise control are expected to experience modest increases in sales.

Impact on Imported and Exported Buses

All imported buses will be subject to this regulation. The percentage of imported buses, when compared to overall domestic bus production, is very small (less than 7 percent of the fleet). Foreign manufacturers are expected to be able to comply competitively with this regulation since many already conform to existing foreign noise standards. Therefore, no appreciable impact on the U.S. balance of trade should occur.

Buses which are manufactured for export are not required to comply with this regulation. Since much of the noise control equipment is expected to be add-on or substitute components, buses produced for export can be manufactured without such noise reducing equipment. Consequently, no appreciable impact from this regulation on U.S. bus exports is expected.

RESPONSE TO COMMENTS TO DRAFT ENVIRONMENTAL IMPACT STATEMENT

The Agency received numerous comments to the proposed noise emission regulation for buses published on September 12, 1977 in the Federal Register (42 FR 45776).

The general public expressed both support and opposition for the regulation. However, most of the public comments, 80 percent, were in favor of the regulation.

Since none of the comments were identified as applying specifically to the Draft Environmental Impact Statement, no attempt is made here to address the public comments. However, the specific questions, comments, and issues raised in the public testimony, written submissions during the public comment period, and conversations with industry representatives are addressed in detail in the "Docket Analysis for the Final Noise Emission Regulation for Buses", EPA Document No. 500/9-80-213. Copies of the Docket Analysis are available for public inspection at all EPA Regional Offices and EPA Headquarters. Copies are available for purchase from the National Technical Information Service and limited quantities are available from:

Mr. Charles Mooney
EPA Public Information Center (PM-215)
U.S. Environmental Protection Agency
Washington, D.C. 20460.

A summary discussion of the major issues raised by the public and the Agency's responses to those issues is presented in the preamble to the regulation.

CONCLUSIONS

The Agency has concluded that at this time the designated exterior and interior noise emission levels for buses and attendant effective dates represent the best combination of public benefits, available noise control technology and cost.

The required noise control technology to achieve the designated levels has been demonstrated and the attendant effective dates have been established to allow manufacturers the lead time requisite to incorporate the necessary design and component changes without disruption to production or the market.

The cost of compliance and possible economic effects have been considered and are believed to be commensurate with the anticipated benefits.

EPA is pursuing a strategy through which major contributors to overall urban noise will be identified and subsequently controlled. This coordinated approach is necessary because a number of different noise sources may be operating in urban areas at the same time, and the quieting of only one such source may not, in itself, be sufficient to reduce the environmental noise to a level the Agency believes is requisite to protect the public health and welfare, as the Act requires.

Surface transportation noise is considered by EPA as the major contributor, on a national basis, to current environmental noise levels. To further reduce this major national noise source, the Agency intends to continue its investigations pursuant to noise regulatory actions for other surface transportation vehicles. Consequently, the noise emission levels specified for buses in the rulemaking are consistent with the Agency's

objective of ultimately reducing the total noise emitted from all surface vehicles, including medium and heavy trucks, buses, automobiles and light duty vehicles, and motorcycles.

EPA believes that the standards are necessary to protect the public health and welfare and are achievable through use of best available technology taking into account the cost of compliance. However, as technological advances occur, lower levels may be achievable. EPA will consider all new information and data which become available or are presented to it, and may subsequently revise the regulation.